



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,984	01/29/2004	Atsushi Kazama	500.43431X00	2796

20457 7590 11/01/2005

ANTONELLI, TERRY, STOUT & KRAUS, LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873

EXAMINER
----------

PETKOVSEK, DANIEL J

ART UNIT	PAPER NUMBER
----------	--------------

2874

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/765,984

Applicant(s)

KAZAMA ET AL.

Examiner

Daniel J. Petkovsek

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on application January 29, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/29/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to the application filed January 29, 2004. Claims 1-12 are pending.

#### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Information Disclosure Statement***

2. The prior art documents submitted by Applicant in the Information Disclosure Statements filed on January 29, 2004, have been considered and made of record (note attached copy of forms PTO-1449).

#### ***Claim Objections***

3. Claims 1, 4, 6, and 11 are objected to because of the following informalities: Regarding claim 1, the paragraph beginning "a first mirror...leaving said *mirror* of said mirror array", needs correction. "Mirror" should be "*mirrors*", since the mirror array has a *plurality* of movable *mirrors*. This same antecedent basis problem exists in claims 4, 6, and 11.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 12 is rejected under 35 U.S.C. 112 for indefiniteness. Regarding the language of claim 12, there are a number of errors that render the claim unable to be properly examined. In the second paragraph, "having a light" does not read clearly. "Receiving a light" or "deflecting a

Art Unit: 2874

light” would read properly. Also in that paragraph, “said collimator array” should read, “said *first* collimator array”. The same problem exists in the paragraph starting “a collimator of said (*first*) collimator array...”. Also, the entire sentence, “a collimator of said (*first*) collimator array of a second collimator array with a plurality of collimators...” does not make sense. Also, later in the same paragraph, *said* collimator also lacks antecedent basis, as it is not known which collimator is being referred to. In the paragraph starting “wherein said mirror....”, the term “said mirror” also lacks antecedent basis, as it is not known which mirror is referred to. The great number of antecedent basis problems and especially the sentence “a collimator of said (*first*) collimator array of a second collimator array with a plurality of collimators....”, renders the Examiner unable to properly examine the claim. Correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-3, 6, and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Yong U.S.P. No. 6,490,384 B2.

Yong U.S.P. No. 6,490,384 B2 teaches (Fig. 3; column 5 line 42 through column 6, line 17) an optical switch 200 comprising: a collimator array 216 including a first collimator 218; a mirror array 222 with a plurality of movable mirrors 224; a first mirror 226; a second mirror 232;

Art Unit: 2874

a second collimator 218; wherein the light leaving said second mirror passes the said first mirror and said mirror array and optically couples to said second collimator, which clearly, fully meets Applicant's claimed limitations.

Regarding claim 2, all of the mirrors are illuminated by the optical signal, and the receiving output collimator/fiber receives the signal.

Regarding claim 3, the mirrors are "fixed" in a generally fixed location so they won't be displaced (see Fig. 3).

Regarding claim 6, the optical path laps (outside thereof) the collimator array 216.

Regarding claims 8 and 10, bases/substrates are inherently included to maintain positioning and apply voltage to position the mirrors properly.

Regarding claim 9, there is one array and a plurality of collimators, which meets the claim language.

Regarding claim 11, the substrate is connected to a circuit (not shown, see column 3, lines 55-67).

8. Claims 1-3, and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Jin et al. U.S.P. No. 6,704,475 B2.

Jin et al. U.S.P. No. 6,704,475 B2 teaches (Fig. 2) an optical switch comprising: a collimator array including a first collimator; a mirror array 210 with a plurality of movable mirrors; a first mirror; a second mirror 215; a second collimator; wherein the light leaving said second mirror passes the said first mirror and said mirror array and optically couples to said second collimator, which clearly, fully meets Applicant's claimed limitations.

Art Unit: 2874

Regarding claim 2, all of the mirrors are illuminated by the optical signal, and the receiving output collimator/fiber receives the signal.

Regarding claim 3, the mirrors are “fixed” in a generally fixed location so they won’t be displaced (see Fig. 2).

Regarding claim 6, the optical path between the first and second mirror laps over the collimator.

Regarding claim 7, the optical path is longer (see Fig. 2). Regarding claim 8, there is inherently a base/support to prevent the optical components from being displaced.

Regarding claim 9, there is one array and a plurality of collimators, which meets the claim language.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yong U.S.P. No. 6,490,384 B2, and further in view of Giles et al. US 2003/0002782 A1/.

Yong U.S.P. No. 6,490,384 B2 teaches (Fig. 3; column 5 line 42 through column 6, line 17) an optical switch 200 comprising: a collimator array 216 including a first collimator 218; a mirror array 222 with a plurality of movable mirrors 224; a first mirror 226; a second mirror 232; a second collimator 218; wherein the light leaving said second mirror passes the said first mirror and said mirror array and optically couples to said second collimator.

Art Unit: 2874

Yong '384 does not explicitly teach "wherein an optical path between said first mirror and said second mirror is preferably formed to include a region *extending more on the fiber side of said collimators* than the other side thereof where said collimators and said fibers are coupled in the longitudinal direction of the couplers."

Giles et al. US 2003/0002782 A1 teaches optical MEMS reflective devices in which a number of the embodiments show a region between mirrors extending in a direction on the input/fiber side of the collimators more than on the collimator side of the optical signal.

Since Yong '384 and Giles '782 are both from the same field of endeavor, the purpose disclosed by Giles '782 would have been recognized in the pertinent art of Yong '384.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ optical MEMS switching devices having multiple mirrors/reflectors in the embodiment (including having an optical path being disposed more on the optical fiber side of the collimators) as disclosed by Giles '782 for the purpose of improving the number of directions that the optical signals can be sent. These embodiments would have been obvious to a person having ordinary skill in the art in order to, for example, couple optical signals behind the input source in order to allow optical switch elements to send these optical transmission in front or behind them (for the purpose of decreasing the overall number of optical elements in the system (i.e. make the device smaller)).

Regarding claim 5, the mirror array and first mirror of Yong '384 are located more on the collimator side of the fibers.

Regarding claim 7, although not explicitly taught in Figure 3 of Yong '384, a person having ordinary skill in the art would have recognized at the time the invention was made that

Art Unit: 2874


the optical paths lengths could be altered and arranged in order for the optical path length to be either shorter, the same, or longer.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, with respect to the state of the art of optical MEMS switching using a plurality of moveable mirrors and other mirrors: PTO-892 form references A and C-F. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Petkovsek whose telephone number is (571) 272-2355. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Daniel Petkovsek  
October 30, 2005

JULIANA KANG  
PRIMARY EXAMINER

 10/31/05